An Analysis of Sustainability Implementation in Malaysian Private Finance Initiative (PFI) Projects: Issues, Challenges and Way Forward

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***Abstract*— Sustainability is a holistic concept whereby covering broad spectrums of aspect social, economic and environmental principles. Private Finance Initiative (PFI) is a long-term approach providing unique opportunity to grasp the issues of sustainability. However, the current implementation of PFI had mistreated to incorporate comprehensive elements of sustainable green development throughout the projects. Thus, the paper intends to investigate the issues, challenges and best practices which significant lead to sustainability performance in Malaysian PFI projects. Employing a focus group method, a brainstorming workshop was conducted involving seventy practitioners and academicians to gather their perceptions on these issues. Data were analysed using thematic analysis. The findings disclosed several key variables of issues and challenges embracing readiness, awareness, policy and documentation, unclear clauses in the concession agreement and Standard of Procedure (SOP) and lack of short–term financial benefits discourages both clients and contractors from embarking on the quest for sustainability development. It is suggested that successful sustainable PFI projects should integrate government support, technology advancement and incentives to both clients and contractors.**

Keywords—*private finance initiative, sustainability, drivers and barriers.*

1. Introduction

Presently, the construction industry has been bombarded with the sustainability terms and their implementation. In construction industry, the output word of "sustainability" is likely to be acquainting to encounter energy consumption, stakeholders' satisfaction and financial result which adhere to three principles namely economic, environmental and social.

Many countries have strengthened their building regulations in order to address sustainability issues such as long term economic benefits, energy saving and environmental protection. Thus, to improve the efficiency and sustainability performance, the Private Finance Initiative (PFI) approach was introduced in procuring public infrastructure projects, aiming to increase better whole life cycle and value for money of the projects. Essentially, PFI should have a direct relationship with the principles of sustainable development, since PFI provide a distinctive characteristic where all the parties involve has to consider the long-term performance of the projects in the pre-construction stage. Many researchers [1] and [2] assert that PFI approach could offer the best sustainable development than the conventional approach.

However, the benefit of sustainability elements in PFI approach has been overlooked [1]. The implementation of PFI seems lacking in terms of promoting the aspects of project sustainability. The factors to achieve significant sustainability performance remain an issue. Many countries have set a series of indicator to measure sustainability performance, however such tools are less concerned with the project's early stages of development and do not cover the whole life cycle of PFI projects. The requirements of sustainability and green accreditation especially in public buildings have exposed the vulnerability of PFI schemes. Therefore, there is a tremendous challenge to reduce the barriers in achieving sustainability or green development in PFI schemes.

The issues of sustainability in Malaysia construction industry are facing the same scenario where the sustainability and greening essentially are still being neglected. According to [3], there are no additional details on sustainability stated in the

concession agreement. The provision of a special purpose vehicle (SPV) deviates from intended the practice and delivery of a significantly sustainable PFI project development. As part of national aspiration towards "Vision 2020", sustainable development has become the national agenda that creates a significant drive towards apprehending a sustainable future. Hence, the challenge to incorporate sustainability may also expose critical issues in current construction practice and must be resolved to uphold the defined concept. Therefore, the paper aims to investigate the drivers and barriers of sustainability encompassing the whole life cycle of PFI procurement.

2. Methodology

A qualitative approach was applied in this study through a brainstorming workshop as the primary means of data collection. The brainstorming workshop was adopted the focus group approach where all the experts are gathered in one time. The focus group assists to bring together important stakeholders in Malaysian PFI projects. A total number of thirty invited participants representing the practitioners included engineers, building surveyors, facility manager, lawyers, auditors and other project team members and also academicians in PFI-related fields attended the two-day workshop. The general advantage of the focus group for this task undoubtedly came from their ability to provide access to a wide range of perspective in a rather short time, enabling deeper insights into group thinking and shared belief and provide their feedback on the issues, drivers and barriers of the current sustainability implementation in PFI projects.

The sampling selections were based on the participants' designation, involvement in PFI project, work experience, professional background, research and publication in PFI area. It can be justified that most of the participants have sound knowledge of Public Private Partnership / Private Finance Initiative (PPP/PFI) projects in Malaysia. Table 1 presents the profile of participants.

The participants were divided into three groups. Each group comprised of ten participants who were guided by a facilitator and a rapporteur. A set of questions on specific variables was provided to each group to allow in-depth discussion. Given a similar theme of sustainability management, the first group discussed on its procedures and implementation, the second group deliberate about issues and challenges while the third group exchanged views on best practiced. A discussion was recorded and was checked against the entire note taken to ensure any useful data were not missing. Finally, the data collected were transcribed and analyses using thematic analysis.

3. Result and discussion: industry outlook

Generally, the processes and phases of the PFI projects is unique and diverge from conventional approach which embrace four phases namely; strategy formulation, procurement, construction and operation and maintenance phases. Sustainability issues should be considered throughout all stages of decision-making to ensure that decisions made are in the best interest of the clients without detriment to the society and the environment. Table 1 present the finding of the workshop. The research findings were divided into four phases of PFI approach and discussed in turn.

Table 1. Issues and Challenges

PFI Phases	Issues and challenges
Strategy Formulation	• Readiness of parties involve • Unclear Client requirements and direction • Unclear Policy and documentation • Long term investments on sustainable technologies • Site planning and local natural resources
Procurement phases	• Concessionaire background • Concession agreement • Miscommunication between all parties involved
Construction Process	• Continuation involvement of client representative from inception stage to the completion stage • Centralised documentation system • Durability of materials and fixtures • Lacking innovation related to cost saving
Operation and maintenance	• Lacking involvement of facilities management consultants during design stage • Rate of maintenance charges • Unclear guideline and Standard Operation Procedure • Limitation of innovation • Lacking supervision

4. Issues and challenges of sustainability management

The discussion denotes five significant issues and

challenges of sustainability management in strategy formulation phase. Firstly, the issue is related to the readiness of all the parties involved. However, the willingness of all parties in changing their paradigm to embrace the concept of sustainable in PFI projects is still debatable. It is necessary that design, construction, operation and maintenance of buildings are aligned with targets in energy efficiency, resource preservation, climate change and human health. The readiness of the PFI construction industry to implement sustainable design development principles is affected by various factors which include culture, political will, infrastructural support, regulations, capacity and capabilities of stakeholders. It is argued that the industry needs to attain certain thresholds such as: appropriate knowledge and skills base, infrastructural capacity, and innovation culture for it to be in a meaningful position to make use of particular sustainable design principles to be implemented on PFI projects.

Secondly were client requirements. Given the unique position of PFI projects being involved for 25-30 years, it is essential to clearly identify the client's requirement in determining how sustainable the development will be. As quoted by the participants, *"Unclear aim and direction of sustainability in client requirement will lead to poor performance of sustainability in PFI projects*". Principally, sustainable building project must deal with cooperation and communication between various parties involved in different stages of the project. PFI clients generally specify outputs rather than input. Clients can use this opportunity to specify a required sustainability performance (e.g. energy usage per year) rather than specifying the use of low energy equipment or facades.

Thirdly was due to Unclear Policy and documentation, as mentioned by participants*, "the sustainability policy must be clearly spelled out in all legally binding documentation".* This statement aligns with [4] mentioned that, there is an overall lack of resources, knowledge and lacking of accessibility to relevant information is a major obstacle in forging ahead the sustainability in PFI projects. The lack of coordination and access to information on sustainability and PFIs needs to change by PFI practitioners and policy makers. One of the mechanisms is to provide a wide-ranging of policy and documentation.

Analysis of the workshop results revealed that many practitioners conflicted with the investment required on sustainable technologies such as innovation; hence limit's a practitioner's motivation towards sustainable performance. In fact, investment on sustainable technologies does not automatically contribute on short term financial return whilst the sustainability performance of project can only be obtained from long-term perspective. In particular, it is noted that the investment on sustainability performance indicator between public and private sectors has not been taken into account and both have a different perceptions. For example, private sector emphasis to earn certain levels of profit and public sector interest on environmental and social impact.

Fifthly, issue and challenges was related to proper site planning and local natural resources. Generally, the mainstream measurement sustainability tools only focus on the environmental aspects in the design and construction stage but do not countenance with social and economic factors do not cover the whole project life cycle. Therefore, there is no measurement tool to consider the procurement aspect in its entirety. According to [2], sustainability is complex and multi-faceted, covering a broad spectrum of topics from habitat conservation and energy consumption, to stakeholder satisfaction and financial results.

There are some issues arise during procurement phase. Firstly is on concessionaire background. Undoubtedly the selection of the suitable concessionaire is critical to the success of a PPP project. As mentioned by [5], the characteristics of PFI projects, great commitments and broad risks assumed by the concessionaire require a best-value approach in the selection of an appropriate concessionaire. A lacking or inappropriate skill and experiences of concessionaires in PFI approach will lead to inefficiency project performance.

Currently, there is no standard form of contract for PFI projects. Workshop analysis discovered that it has been emphasised that the establishment of regulation framework is a pre-requisite for PFI projects such as concession contract. According to the participants "there *is no standard concession agreement being implemented in current PFI projects".* Parallel to research by [3], there are no additional details on sustainability stated in the concession. It is argued that sustainability could not be implemented without the integration of all parties involved, both government and private sectors. The guideline, regulation and policy of sustainable development must be prompted spell out in those documents. For example, reducing the use of energy, water and other resources, minimising waste

and controlling pollution and other quality objectives, must be instigated at the specification stage, selecting bidders and awarding contracts stage. It is vital to be clear what is acceptable at each stage.

Thirdly, was concerning the communication issues. *"A clear establishment of the line of communication between all the parties in the concession is vital*" remark by the participants. Communication was observed to be a challenge throughout the project. Communication between members of the core project team were observed to be good which was perhaps due to the fact that the team were all located in the same area and had built good relationships. Pursuing sustainability requires a continuous process of change. Hence, the construction industry is facing ever-increasing demands to improve its sustainability performance. The study by [6] suggested that a concession time period in must incorporate the benefits, authorities and responsibilities among various project parties for the interests of better sustainability. It is vital to have a virtuous relationship among practitioners and will lead them to ensure that sustainability measures were prioritised throughout the project.

A number of impediments and stimulants to sustainability were observed which arose at the level of construction process throughout the workshop. Firstly, was to relay on the continuation of client representative. It has been suggested that commitment of the client to the project goals was suggested as one of the key success factors when ensuring that sustainability goals are met. [7], denotes that one of the key instruments towards successful of PFI projects was client involvement. Over the discussion, participants raised that client may play the dominant role of "champions" to innovative products and processes towards the sustainability such achievement of sustainable energy objectives. Increased client awareness and environmental responsibility may create a sense of ownership to support sustainable development.

Secondly, the participants were raised the issues on the necessity of a centralised documentation system. *"Stakeholders must be able to refer to the same documentation through a digital centralised documentation system*" mentioned by the participants. [8] stated that the Government policies and strategies are significant when considering the amount of support to be given to private industries and the degree of intervention. Therefore, it is vital that the government should consider forming a centralised documentation system of PFI approach to strategically plan and coordinate at a macro level the overall output of the sustainability issues.

Thirdly, the selection of materials and fixtures express in output based specification was highlighted as a vital element to reinforce the sustainable performance. The participants' quoted "the *utilisation and selection of materials and fixtures is vital without compromising the concept of Value for Money (VFM)".* The materials selected must conform to certain criteria (e.g. non-hazardous, sustainable, and non-expensive), and these criteria should be standardised across the whole building.

Whereas, four significant issues and challenges in operation and maintenance phase revealed. The first issue was on the lack of involvement of facilities management during design phase. As mentioned by participants *"facilities provided does not fit for purpose for occupancy, because there are lacking involvement of facilities management consultants during the design process and may lead to poor sustainability performance of PFI projects*. Traditionally, design is separated from construction, operation, maintenance, and services provision. The separation of design from the post construction processes has resulted in many problems, such as the lack of constructability, operability, maintainability, and serviceability, for designed facilities including sustainability issues. However, the prevailing view is that PFI provides real incentives to innovate by putting in place unique cooperative arrangements between clients, designers, constructors and operators. The strategies adopted by project managers to achieve sustainability in construction projects are crucial for the operational level of the industry.

The second issues and was related to improper and unclear sustainability guideline during operation phase. "*The Service Delivery Manual (SDM), Schedule of Accommodation (SOA) and maintenance guideline does not quantify the sustainability works that need to be done"* argued by the participants. Principally, the guideline should demonstrate and spell out that any specified environmental standard is reasonable, achievable and cost effective. The inclusion of sustainable technologies with what might appear to be higher up-front capital costs will need to be explained in terms of their cost effectiveness and beneficial.

Third issues and challenges had been revealed was lacking supervision concerning of sustainability performance by concessionaires during operational phase of projects. The facilities management consultant's role in addressing sustainability is vital, includes checking for the appropriateness of various sustainability aspects and offering input concerning the quality services provided to end users. However, the participant's claims that "*concessionaires do not monitor the quality of*

services provided by its subordinate in the PFI projects". Hence, the efficiency of sustainability performance was doubt. It was observed that this issue has led them to ensure that sustainability measures were prioritised throughout the project.

5. Away forward: industry outlook

Figure 1 demonstrates a set of the way forward can be developed in a sustainable manner namely: Clients involvement and awareness, government policy and support, best practice of new technology, reinforce research and development and cultivating effective communication.

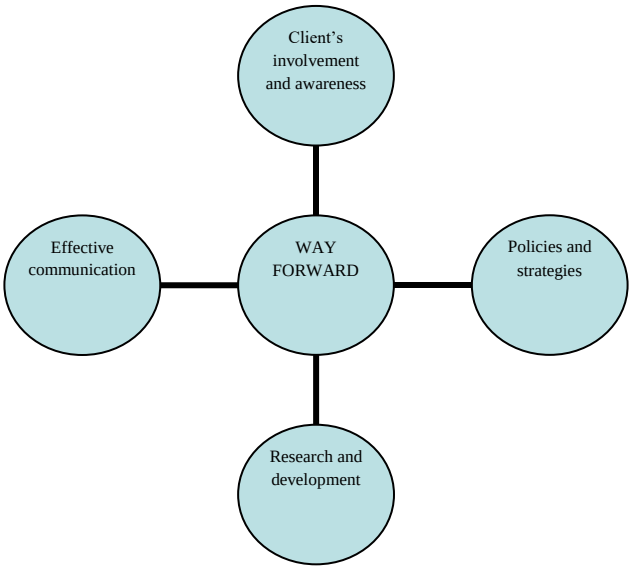

Figure 1. A way forward of Sustainability development in PFI approach

The first strategy is the client's involvement and awareness including knowledgeable and a long-term vision for positioning the sustainability in PFI approach is obligatory at the outset of the projects. Extensive consultation with professional bodies, industry practitioners, academia and other relevant non-government organizations are essential in the process of developing the vision to rightly position the construction industry and enable a sustainable PFI roadmap to be established. Motivated clients can steer the industry to deliver sustainable construction projects and the clients' interest could be improved with the help of new tools and techniques that demonstrate the benefits of sustainable in PFI projects. With intense competition in construction services, various industry stakeholders should continuously strive to sharpen their competitive edges, to stay ahead of their competitors locally and internationally. Competitiveness enhancement especially on technological and managerial aspects was commented to be essential.

Principally, the industry needs guidance from the Government in the form of regulations and legislation, which would drive the industry towards sustainability. Government policies and strategies are significant when considering the amount of support to be given to private industries and the degree of intervention necessary. Thus, the government should be responsible to inject additional funding to carry out sustainable construction projects and considered in the formulation for a long-term plan.

In addition, Research and Development (R&D) were significantly contributed as strategies of sustainable development which is related to productivity breakthroughs and competitiveness enhancement. R&D helps develop new knowledge, introduce better materials, more cost-effective design and construction techniques, and labour-saving equipment. As quoted by the participants, in enhancing the growth of sustainability concept, there is a need for researchers to identify the benefits of sustainable technologies in the long term throughout the whole life cycle of PFI approach. For example, for the overseas markets, clients tend to require contractors to be capable of managing various dimensions of construction projects with high level of technology and advanced experience. To capture these new demands, decision makers should adopt a new corporate orientation in other sectors to help them thrive in the new environment

Effective communication throughout the whole life cycle of PFI approach is one of the significant strategies revealed from the analysis. [9] underline the importance of close collaboration among designers, engineers and other consultants to introduce innovative environmentally sound technologies into building systems. The participants believe that "*systematic involvement of those responsible for the building's operation as early as possible during the project life cycle can stimulate innovation. This is particularly important for environmental innovations, given the important role operators can play in the energy-efficient management of buildings". Thus,* the need for effective communication and collaboration is particularly vital in the development of sustainable buildings

6. Conclusion

This qualitative study has identified a list of possible issues, challenges and strategic directions for government and industry stakeholders' consideration in view of the future development. Five key strategic directions have been formulated: (i) Enhancing client involvement and awareness; (ii) Formulating government policy and support; (iii) Fostering best practice of new technology; (iv) Reinforce research and development activities and (v) Cultivation of effective communication. The findings of the research may help policy makers and PFI practitioners to map out viable and appropriate policies and strategies of sustainability development for PFI approach. It is also necessary to take appropriate measures to upgrade construction companies' operations and enhance their competitiveness to meet the market requirements and their sustainable growth.

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